REMARKS

Claims 1-13, 24-29 and 51-53 are currently pending.

The allowance of claims 1-11 and 24-29, and the indication of allowable subject matter in claims 13, 51 and 52 are hereby acknowledged. However, Applicants believe that all of independent claims are in condition for allowance, and respectfully request reconsideration and withdrawal of the rejections in the outstanding Office Action.

Examiner Interview

The Examiner is thanked for the courtesies extended to the undersigned during the personal interview held July 28, 2008. During the interview, claim 12 was discussed at length with particular attention directed to its differences from the disclosures of Nystrom and Adachi. The remarks provided below are substantially the same remarks as presented in the Interview, and Applicants submit that the following includes the substance of the interview.

Rejection of claims 12 and 53

Claims 12 and 53 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,412,351 to Nystrom, in view of U.S. Patent Application Publication No. 2001/0050962 to Adachi and further in view of U.S. Patent No. 6,608,868 to Murakami OR U.S. Patent No. 5,638,404 to Crozier. Applicants traverse this rejection and respectfully assert that the applied prior art fails to disclose all of the claimed limitations.

Applicants note that claim 12 was previously rejected under the combination of Nystrom and Adachi in the Office Action dated June 2, 2006.

As for the present Office Action, the Office asserts on page 2 that Fig. 1, col. 1, lines 16 to 28, col. 2, lines 60 to 67, and col. 3, lines 1 to 14, of the Nystrom reference disclose the features of claim 12 with respect to “during all transition states of the quadrature modulated data signal in which data symbols can change in value, reducing the power to zero such that transmitted power decreases to zero at approximately a mid point of each of the transitional states.” Applicants respectfully disagree for the following reasons.

In Fig. 1 and col. 1, lines 16 to 28, Nystrom refers to a quadrature network 140, at whose input is a sinusoidal signal, which can be described by the formulaic relation A*cos(2π*freq), where "A" represents the amplitude of the sinusoidal signal and "freq" represents its frequency. In Fig. 1, amplitude A is shown with a deterministic value A=1. Since Nystrom states the

sinusoid period is "2x", and since frequency is inversely proportional to the period, the frequency of the signal in this instance is derived to be freq=1/2x, which is also deterministic. Likewise, since the phase of a cosine signal is considered to be exactly zero degrees, the phase of the input signal is deterministic as well. Accordingly, all aspects (i.e., the amplitude, frequency or phase) of the input signal are deterministic.

In this regard, the amplitude, frequency and/or phase of the input signal may be modulated (e.g., “imprinted with information”) in order to obtain a modulated signal (sometimes also referred to as “the information carrying signal”). However, in Fig. 1 this is not the case since the quadrature network outputs provide a "in-phase signal" strictly according to the relation A/sqrt(2) * cos(2п*freq), and a "quadrature phase signal" strictly according to the relation A/sqrt(2) * sin(2п*freq) = A/sqrt(2) * cos(2п*freq - п/2), and thus no modulation is taking place. As a result, without modulation ***there are no data symbols*** introduced into these signals (i.e., ***the signals do not carry any modulated information***). This is because the only two changes that are taking place in the quadrature network 140 of Fig. 1 are deterministic. In particular, the two deterministic changes are: (1) the amplitude of the output signals 110, 120 of the quadrature network 140 is reduced by a factor 1/sqrt(2) for total-power-conservation reasons, in order to reflect that exactly one half of the input power goes to each of the two outputs; and (2) one of the outputs is shifted by deterministic phase п/2 = 90 degrees with the respect to the other (i.e., in Fig. 1, the output labeled 120 is "lagging" the output labeled 110 by 90 degrees).

Accordingly, since all the signals shown in Fig. 1 are deterministic, that is, such signals are unmodulated and do not carry any information, and since claim 12 requires that a state transition of a modulated signal occur with respect to the data symbols that can change in value (i.e., a transition in the information-carrying signal), there are no grounds for describing the transitional states with the respect to any zero crossings in Fig. 1.

To a person having ordinary skill in the art, the two outputs are known as “the Local Oscillator (LO) in-phase cosine wave" and “the LO quadrature sine wave", and are actually presented as such in Figure 5(a), as outputs of the quadrature network labeled "420" (See col. 3, lines 6 to 12, in particular, see line 12 in which Nystrom refers to the two outputs as “the local oscillator carriers".)

As stated in col. 2, line 68 to col. 3, line 6, the LO in-phase cosine wave and the LO quadrature sine wave are mixed with the data streams "I" and "Q" using mixers 405 and 410. I and Q are described in col. 2, lines 60 to 67, where Nystrom teaches that the information-

carrying signals are separated into two individual data streams – "I" for in-phase digital data stream 425, and "Q" for quadrature data stream 430, as shown in Fig 5(a).

In col. 3, lines 10 to 14, Nystrom teaches that the I & Q information signals modulate the local oscillator in-phase and quadrature carriers to produce a single QPSK (quadrature phase-shift keying) modulated output signal, and in col. 3, lines 25 to 27, Nystrom teaches that the QPSK modulation produces a four-point constellation 485, shown in Fig. 5(c). It is this QPSK constellation shown in Fig. 5(c) that represents the information-carrying aspect of the modulation format.

In this regard, col. 3, lines 27 to 31 of Nystrom state that the QPSK constellation of Fig. 5(c) has a property to ***occasionally*** swing through zero output power. In particular, according to Fig. 5(c), the QPSK constellation swings through the zero output upon a state transition from (0,1) to (1,0), (1,0) to (0,1), (1,0) to (0,1), or (0,1) to (1,0), but does not swing through the zero output for the remaining state transitions of (0,1) to (0,0), (0,1) to (1,1), (0,0) to (1,0), (0,0) to (0,1), (1,0) to (0,0), (1,0) to (1,1), (1,1) to (0,1), and (1,1) to (1,0).

In conclusion, Nystrom illustrates the state of the art for generating QPSK signals that do not reduce power to zero during all transitional states; in fact they do not reduce power to zero for the majority of transitional states.

By contrast, claim 12 provides that during ***all*** transition states of the quadrature modulated data signal the power is reduced to zero such that transmitted power decreases to zero at approximately a mid point of ***each*** of the transitional states, which is exemplified in Fig. 3 of the present application. In particular, Fig. 3 shows a QRZ (Quadrature Return to Zero) constellation, in which for any transition from one to state to another the constellation swings through zero power.

Adachi is cited for its disclosure of an optical signal. Adachi does not overcome nor is it asserted to overcome the above deficiencies of Nystrom.

As for Murakami et. al, none of the figures show a reduction of power to zero during all transitional states, only for some transitional states. For example, the text in col. 7 line 25 – col. 8, line 20 discusses 16 APSK that is a well-known modulation format that does not reduce transmitted power during all transitional states. It also discusses QAM, another well-known modulation format that does not reduce transmitted power during all transitional states. Murakami et. al discusses the addition of pilot symbols to this modulation format that can be constructed such that they occupy opposite states in the constellation diagram such that during the transitional state corresponding to the pilot symbol the transmitted power reaches zero. This

pilot symbol does not transfer information and can therefore only occupy a limited number of state transitions or else the communication system ceases to convey actual information. Therefore such state transitions that correspond to pilot symbols cannot occupy the majority of state transitions and again this reference illustrates modulation formats that do not reduce power to zero during all transitional states, in fact they do not reduce power to zero for the majority of transitional states.

As for Crozier, it discusses an FM modulated system. As is well known FM modulated systems have constant output envelope, and the author puts considerable effort in allowing the use on a non-linear amplifier whilst maintaining the properties of constant envelope output. Thus this patent does in no way demonstrate zero transitions of the power during transitional states. The figures shown could be interpreted as having zero transitions of transmitted power during some transitional states, notably those between opposite states, but the majority of transitional states do not have zero transmitted power. Conversely, it appears that Crozier is putting effort in maintaining a constant signal envelope (or power). As is well known in radio technology, FM (frequency modulation) modulators (as used in the output stages of this patent) maintain signal power, in contrast to AM (amplitude modulation) modulators where the output power varies.

Accordingly, for at least these reasons, the cited references, either individually or in combination, do not render obvious the subject matter of claims 12 and 53, which depends from claim 12. Claims 12 and 53 are allowable.

CONCLUSION

Applicants assert that all claims pending in the present application are in condition for allowance and respectfully request that the Examiner pass this case to issuance at the Examiner's earliest convenience.

The Examiner is invited to contact the undersigned at (202) 220-4200 to discuss any matter concerning this application. Applicants authorize payment of the appropriate fees under 37 CFR §§1.16 or 1.17 and crediting any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

Dated: July 30, 2008

/Martin E. Miller/
Martin E. Miller
Registration No. 43,698

KENYON & KENYON LLP
1500 K Street, N.W. – Suite 700
Washington, D.C. 20005-1257
Telephone: (202) 220-4200
Facsimile: (202) 220-4201